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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/551,051	04/18/2000	Arup K. Basak		2218

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EXAMINER

SHOSHO, CALLIE E

ART UNIT	PAPER NUMBER
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1714

DATE MAILED: 05/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/551,051

Applicant(s)

BASAK ET AL.

Examiner

Callie E. Shosho

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 19 February 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-7 and 9-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 9-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

1. In light of the new grounds of rejection as set forth below, the following action is non-final.

**Claim Rejections - 35 USC § 103**

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-7, 9, 11-12, 14, and 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doi et al. (U.S. 6,378,999) in view of Zhu (U.S. 5,889,083) and either Sano et al. (U.S. 5,324,349) or Kubota et al. (U.S. 6,323,370).

Doi et al. disclose ink jet ink comprising 0.5-20% pigment, 0.002-10% dispersant including those obtained from styrene and acrylic acid, 1-10% solvent including ethanol, 0.01-3% surfactant, biocide, humectant (diethylene glycol, polypropylene glycol, polyethylene glycol), and water. The ink has conductivity of 500-7400  $\mu\text{S}/\text{cm}$ , viscosity of 1.5-10 mPa s, pH of 4.5-9.5, and particle size of 15-200 nm (col.2, lines 25-26 and 44-46, col.4, lines 23-25 and 27-50, col.5, lines 46-56, col.6, lines 10-17, 24, 30-31, and 46, col.7, lines 7-8, col.8, lines 34-37, col.9, lines 40-43 and 64-65, col.10, lines 14-20, 24-27, 34-35, and 52-60, col.12, lines 4-5, 18-19, and 23-25, col.14, lines 25-26, and col.16, lines 42-43).

While there is no disclosure that the dispersant is solubilized with ammonium hydroxide, it is noted that col.6, lines 10-24 of Doi et al. disclose that the dispersant is a copolymer obtained

from hydrophilic monomer and hydrophobic monomer or salt thereof wherein the salts include onium salts of ammonium ion. Given that in the present invention, the acid portion of the dispersant is solubilized with ammonium hydroxide in order to form a salt, it is clear that the disclosure of Doi et al. that the dispersant is in the form of a salt is equivalent to applicants' disclosure that the dispersant is solubilized with ammonium hydroxide. That is, both the reference and the present invention produce the same end result, namely, dispersant in the form of a salt. Additionally, although there is no disclosure in Doi et al. that the ammonia volatilizes upon heating, given that Doi et al. is drawn to ink jet inks which are heated upon printing, it therefore would have been obvious to one of ordinary skill in the art to infer that the ammonia is intrinsically volatilized upon heating.

Further, it is noted that Doi et al. disclose use of surfactant but not defoamer as presently claimed. However, the surfactants disclosed by Doi et al. such as acetylene glycol and silicone based surfactants are well known, as evidenced by Zhu (col.10, lines 11-44), as defoamers.

The difference between Doi et al. and the present claimed invention is the requirement in the claims of (a) amount of acrylic resin emulsion in ink composition and (b) particle size of ink.

With respect to difference (a), on the one hand, given that Doi et al. disclose that the acrylic polymer emulsion is used to control ink properties, it therefore would have been obvious to one of ordinary skill in the art, absent evidence to the contrary, to choose amount of emulsion, including that presently claimed, in order to produce ink with desired properties, and thereby arrive at the claimed invention.

On the other hand, Sano et al., which is drawn to ink jet inks, disclose the use of 1-25% acrylic resin emulsion that comprises, for instance, 45-50% resin. Sano et al. disclose that if the amount of resin emulsion utilized is too large, the resulting ink cannot produce an image with high optical density and tends to have excessively high viscosity while if the amount of resin emulsion is too small, the effects of the emulsion cannot be expected (col.4, lines 12-16, col.5, lines 26-34, col.7, line 47, and col.8, line 32).

Alternatively, Kubota et al., which is drawn to ink jet inks, disclose the use of 1-25% acrylic resin emulsion which comprises, for instance, 50% resin, in order to increase scratch resistance of print (col. 6, lines 17-20 and 26, col.7, lines 15-16, and col.9, line 65).

In light of the motivation for using specific amount of acrylic resin emulsion disclosed by Sano et al. or Kubota et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use this amount of acrylic emulsion in the ink of Doi et al. in order to produce ink with suitable optical density and viscosity or alternatively, good scratch resistance, and thereby arrive at the claimed invention.

With respect to difference (b), Doi et al. disclose that the number average particle size of the ink is 15-200 nm while the volume average particle size of the ink is 30-250 nm both of which appear to fall outside the scope of present claims 15 and 21 which require particle size of 280-300 nm. However, it is noted that Doi et al. disclose average particle size not particle size as presently claimed. Given that it is average particle size, it would have been within the skill level of one of ordinary skill in the art to recognize that the ink also includes particles which would fall above and below this average value including those with particle size of 280-300 nm as

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presently claimed, and thus, one of ordinary skill in the art would have arrived at the claimed invention.

4. Claims 10, 13, 15, 20, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doi et al. in view of Zhu and either Sano et al. or Kubota et al. as applied to claims 1-7, 9, 11-12, 14, and 16-19 above, and further in view of Ma et al. (U.S. 6,455,628).

The difference between Doi et al. in view of Zhu and either Sano et al. or Kubota et al. and the present claimed invention is the requirement in the claims of the surface tension of the ink.

Doi et al. disclose that surfactants are used to control the surface tension of the ink (col.9, lines 40-43), however, there is no explicit disclosure of the surface tension of ink comprising water, ethanol, solubilized dispersant, pigment, defoamer, and acrylic emulsion as presently claimed.

However, in light of the teaching of Doi et al. that the surface tension of the ink is controlled using surfactants and given that Doi et al. disclose ink containing identical ingredients, i.e. water, ethanol, solubilized dispersant, pigment, defoamer, and acrylic emulsion, as presently claimed, it therefore would have been obvious to one of ordinary skill in the art to control the surface tension of the ink to produce ink jet ink with suitable surface tension which is especially important in ink jet inks wherein the surface tension affects the drop size, jet velocity, drying speed, etc. of the ink.

Evidence to support this position is found in Ma et al., which discloses that pigmented ink jet inks suitable for use in ink jet printing systems typically have surface tension in the range of about 20 to 70 dyne/cm, preferably 30-70 dyne/cm (col.7, line 65-col.8, line 1).

In light of the above, and absent evidence to the contrary, it therefore would have been obvious to one of ordinary skill in the art to control the surface tension of the ink to values, including those presently claimed, in order to produce ink with desired drop size, jet velocity, drying speed, etc., and thereby arrive at the claimed invention.

#### **Response to Arguments**

5. Applicants arguments filed 2/19/03 have been fully considered, but they are not persuasive.

Specifically, applicants argue that:

- (a) the surfactants of Doi et al. are not equivalent to the defoamers of Zhu et al.
- (b) No motivation to combine Doi et al. that Zhu given that the references teach away from their combination.
- (c) No disclosure of surface tension in Doi et al.

With respect to argument (a), it is noted that examiner previously argued that given that Doi et al. disclose the use of surfactant such as acetylene glycol and silicone-based surfactant and given that Zhu discloses the use of acetylenic defoamers and silicone defoamers, it is clear that the surfactants of Doi et al. are also defoamers.

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Applicants argue that Zhu does not teach that acetylene glycol and silicone-based surfactant are defoamers and that just because two compounds share the same name does not mean they share the same properties.

However, it is noted that col.9, line 65 and col.10, lines 8-9 of Doi et al. disclose the use of acetylene glycol and silicone-based surfactant. Zhu (col. 10, lines 17-18) teaches that defoamers for ink jet inks include silicone defoamers and acetylenic defoamers. Further, col.10, lines 31-49 of Zhu disclose the use of specific types of acetylenic defoamers which include those known under the tradename Surfynol. The acetylenic defoamers include Surfynol TG, Surfynol 465, Surfynol 82, Surfynol 104, Surfynol 485, and Surfynol 440 (col.10, lines 31-44) which are well known, as evidenced in col.5, lines 55-58 of Takemoto (U.S. 6,488,751), as acetylenic glycols.

Thus, it is clear that the acetylenic glycols disclosed by Doi et al. which include those known under the tradename Surfynol TG, Surfynol 465, and Surfynol 485 (see for instance, examples 6, 7, 9, 10, 12, and 17) are in fact defoamers.

With respect to argument (b), applicants argue that given that Doi et al. teach that water-soluble dye-based ink jet ink has problems in water resistance and lightfastness and that Zhu is drawn to water-soluble dye-based ink jet, it is improper to combine the references given that the references teach away from the combination.

However, it is noted that dye-based ink is just one embodiment of Zhu, which also discloses the use of pigment-based ink (col.3, line 27 and 29-56 and all examples). Further, both



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Doi et al. and Zhu are water-based inks. Finally, it is noted that Zhu is only used as evidence to support examiner's position that surfactants disclosed by Doi et al. also function as defoamers.

Thus, it is the examiner's position that the two references do not teach away from their combination.

With respect to argument (c), in response to examiner's previous position that the ink of Doi et al. intrinsically possesses surface tension as presently claimed, applicants argue that given that the ink of Doi et al. is not identical to the ink as presently claimed, i.e. no disclosure of the amount of acrylic emulsion present, the ink cannot intrinsically possess surface tension as presently claimed.


It is noted that Doi et al. is now used in combination with a new reference, namely, Ma et al., which teaches that pigmented ink jet inks suitable for use in ink jet printing systems typically have surface tension in the range of about 20 to 70 dyne/cm, preferably 30-70 dyne/cm. In light of this, given that Doi et al. teach that the surface tension of the ink is controlled using surfactants, given that Doi et al. disclose ink containing identical ingredients, i.e. water, ethanol, solubilized dispersant, pigment, defoamer, and acrylic emulsion, as the ink presently claimed, and given that the combination of Doi et al. and either Sano et al. and Kubota et al. disclose ink identical to that presently claimed, i.e. identical in both type and amounts of ingredients, it is the examiner's position that, absent evidence to the contrary, that it would have been obvious to one of ordinary skill in the art to control the surface tension of the ink to values, including those presently claimed, and thereby arrive at the claimed invention.

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6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Callie E. Shosho whose telephone number is 703-305-0208. The examiner can normally be reached on Monday-Friday (6:30-4:00) Alternate Fridays Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on 703-306-2777. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

  
Callie E. Shosho  
Examiner  
Art Unit 1714

CS  
May 9, 2003